SEQUENCE LISTING

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<120> Polycation-Sensing Receptor in Aquatic
    Species and Methods of Use Thereof

<130> 2856.1001-007

<140> 09/162,021
<141> 1998-09-28

<150> PCT/US97/05031
<151> 1997-03-27

<150> 08/622,738
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<170> FastSEQ for Windows Version 4.0

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atggggattg atcttccagg agttctgctg taaagcgatc cctcaccatt acaaagataa 360
gcagaaatcc tccaggcatc ctctgtaaac gggctggcgt agtgtggctt ggtcaaggaa 420
cagagacagg gctgcaca atg gct cag ctt cac tgc caa ctc tta ttc ttg    471
                     Met Ala Gln Leu His Cys Gln Leu Leu Phe Leu
                      1               5                  10


gga ttt aca ctc cta cag tcg tac aat gtc tca ggg tat ggt cca aac    519
Gly Phe Thr Leu Leu Gln Ser Tyr Asn Val Ser Gly Tyr Gly Pro Asn
            15                  20                  25


caa agg gcc cag aag aaa gga gac atc ata ctg gga ggt ctc ttc cca    567
Gln Arg Ala Gln Lys Lys Gly Asp Ile Ile Leu Gly Gly Leu Phe Pro
        30                  35                  40


ata cac ttt gga gta gcc gcc aag gat cag gac tta aaa tcg aga ccg    615
Ile His Phe Gly Val Ala Ala Lys Asp Gln Asp Leu Lys Ser Arg Pro
    45                  50                  55
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gag gcg aca aaa tgt att cgg tac aat ttt cga ggc ttc cga tgg ctc     663
Glu Ala Thr Lys Cys Ile Arg Tyr Asn Phe Arg Gly Phe Arg Trp Leu
 60              65              70              75

cag gcg atg ata ttc gca att gaa gag att aac aac agt atg act ttc     711
Gln Ala Met Ile Phe Ala Ile Glu Glu Ile Asn Asn Ser Met Thr Phe
             80              85              90

ctg ccc aat atc acc ctg gga tat cgc ata ttt gac acg tgt aac acc     759
Leu Pro Asn Ile Thr Leu Gly Tyr Arg Ile Phe Asp Thr Cys Asn Thr
             95              100             105

gtg tcc aag gcg cta gag gca aca ctc agc ttt gtg gcc cag aac aaa     807
Val Ser Lys Ala Leu Glu Ala Thr Leu Ser Phe Val Ala Gln Asn Lys
         110             115             120

atc gac tcg ctg aac tta gat gag ttc tgt aac tgc tct gac cat atc     855
Ile Asp Ser Leu Asn Leu Asp Glu Phe Cys Asn Cys Ser Asp His Ile
     125             130             135

cca tcc aca ata gca gtg gtc ggg gca acc ggg tca gga atc tcc acg     903
Pro Ser Thr Ile Ala Val Val Gly Ala Thr Gly Ser Gly Ile Ser Thr
140             145             150             155

gct gtg gcc aat cta ttg gga tta ttt tac att cca cag gtc agc tat     951
Ala Val Ala Asn Leu Leu Gly Leu Phe Tyr Ile Pro Gln Val Ser Tyr
             160             165             170

gcc tcc tcg agc agg ctg ctc agc aac aag aat gag tac aag gcc ttc     999
Ala Ser Ser Ser Arg Leu Leu Ser Asn Lys Asn Glu Tyr Lys Ala Phe
             175             180             185

ctg agg acc atc ccc aat gat gag caa cag gcc acg gcc atg gcc gag    1047
Leu Arg Thr Ile Pro Asn Asp Glu Gln Gln Ala Thr Ala Met Ala Glu
         190             195             200

atc atc gag cac ttc cag tgg aac tgg gtg gga acc ctg gca gcc gac    1095
Ile Ile Glu His Phe Gln Trp Asn Trp Val Gly Thr Leu Ala Ala Asp
     205             210             215

gat gac tat ggc cgc cca ggc att gac aag ttc cgg gag gag gcc gtt    1143
Asp Asp Tyr Gly Arg Pro Gly Ile Asp Lys Phe Arg Glu Glu Ala Val
220             225             230             235

aag agg gac atc tgt att gac ttc agt gag atg atc tct cag tac tac    1191
Lys Arg Asp Ile Cys Ile Asp Phe Ser Glu Met Ile Ser Gln Tyr Tyr
             240             245             250

acc cag aag cag ttg gag ttc atc gcc gac gtc atc cag aac tcc tcg    1239
Thr Gln Lys Gln Leu Glu Phe Ile Ala Asp Val Ile Gln Asn Ser Ser
             255             260             265

gcc aag gtc atc gtg gtc ttc tcc aat ggc ccc gac ctg gag ccg ctc    1287
Ala Lys Val Ile Val Val Phe Ser Asn Gly Pro Asp Leu Glu Pro Leu
             270             275             280

atc cag gag ata gtt cgg aga aac atc acc gat cgg atc tgg ctg gcc    1335
Ile Gln Glu Ile Val Arg Arg Asn Ile Thr Asp Arg Ile Trp Leu Ala
         285             290             295
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agc gag gct tgg gcc agc tct tcg ctc att gcc aag cca gag tac ttc      1383
Ser Glu Ala Trp Ala Ser Ser Ser Leu Ile Ala Lys Pro Glu Tyr Phe
300             305             310             315

cac gtg gtc ggc ggc acc atc ggc ttc gct ctc agg gcg ggg cgt atc      1431
His Val Val Gly Gly Thr Ile Gly Phe Ala Leu Arg Ala Gly Arg Ile
                320             325             330

cca ggg ttc aac aag ttc ctg aag gag gtc cac ccc agc agg tcc tcg      1479
Pro Gly Phe Asn Lys Phe Leu Lys Glu Val His Pro Ser Arg Ser Ser
            335             340             345

gac aat ggg ttt gtc aag gag ttc tgg gag gag acc ttc aac tgc tac      1527
Asp Asn Gly Phe Val Lys Glu Phe Trp Glu Glu Thr Phe Asn Cys Tyr
        350             355             360

ttc acc gag aag acc ctg acg cag ctg aag aat tcc aag gtg ccc tcg      1575
Phe Thr Glu Lys Thr Leu Thr Gln Leu Lys Asn Ser Lys Val Pro Ser
    365             370             375

cac gga ccg gcg gct caa ggg gac ggc tcc aag gcg ggg aac tcc aga      1623
His Gly Pro Ala Ala Gln Gly Asp Gly Ser Lys Ala Gly Asn Ser Arg
380             385             390             395

cgg aca gcc cta cgc cac ccc tgc act ggg gag gag aac atc acc agc      1671
Arg Thr Ala Leu Arg His Pro Cys Thr Gly Glu Glu Asn Ile Thr Ser
                400             405             410

gtg gag acc ccc tac ctg gat tat aca cac ctg agg atc tcc tac aat      1719
Val Glu Thr Pro Tyr Leu Asp Tyr Thr His Leu Arg Ile Ser Tyr Asn
            415             420             425

gta tac gtg gcc gtc tac tcc att gct cac gcc ctg caa gac atc cac      1767
Val Tyr Val Ala Val Tyr Ser Ile Ala His Ala Leu Gln Asp Ile His
            430             435             440

tct tgc aaa ccc ggc acg ggc atc ttt gca aac gga tct tgt gca gat      1815
Ser Cys Lys Pro Gly Thr Gly Ile Phe Ala Asn Gly Ser Cys Ala Asp
        445             450             455

att aaa aaa gtt gag gcc tgg cag gtc ctc aac cat ctg ctg cat ctg      1863
Ile Lys Lys Val Glu Ala Trp Gln Val Leu Asn His Leu Leu His Leu
460             465             470             475

aag ttt acc aac agc atg ggt gag cag gtt gac ttt gac gat caa ggt      1911
Lys Phe Thr Asn Ser Met Gly Glu Gln Val Asp Phe Asp Asp Gln Gly
                480             485             490

gac ctc aag ggg aac tac acc att atc aac tgg cag ctc tcc gca gag      1959
Asp Leu Lys Gly Asn Tyr Thr Ile Ile Asn Trp Gln Leu Ser Ala Glu
            495             500             505

gat gaa tcg gtg ttg ttc cat gag gtg ggc aac tac aac gcc tac gct      2007
Asp Glu Ser Val Leu Phe His Glu Val Gly Asn Tyr Asn Ala Tyr Ala
            510             515             520

aag ccc agt gac cga ctc aac atc aac gaa aag aaa atc ctc tgg agt      2055
Lys Pro Ser Asp Arg Leu Asn Ile Asn Glu Lys Lys Ile Leu Trp Ser
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       525                      530                      535

ggc ttc tcc aaa gtg gtt cct ttc tcc aac tgc agt cga gac tgt gtg    2103
Gly Phe Ser Lys Val Val Pro Phe Ser Asn Cys Ser Arg Asp Cys Val
540             545             550             555

ccg ggc acc agg aag ggg atc atc gag ggg gag ccc acc tgc tgc ttt    2151
Pro Gly Thr Arg Lys Gly Ile Ile Glu Gly Glu Pro Thr Cys Cys Phe
            560             565             570

gaa tgc atg gca tgt gca gag gga gag ttc agt gat gaa aac gat gca    2199
Glu Cys Met Ala Cys Ala Glu Gly Glu Phe Ser Asp Glu Asn Asp Ala
        575             580             585

agt gcg tgt aca aag tgc ccg aat gat ttc tgg tcg aat gag aac cac    2247
Ser Ala Cys Thr Lys Cys Pro Asn Asp Phe Trp Ser Asn Glu Asn His
        590             595             600

acg tcg tgc atc gcc aag gag atc gag tac ctg tcg tgg acg gag ccc    2295
Thr Ser Cys Ile Ala Lys Glu Ile Glu Tyr Leu Ser Trp Thr Glu Pro
        605             610             615

ttc ggg atc gct ctg acc atc ttc gcc gta ctg ggc atc ctg atc acc    2343
Phe Gly Ile Ala Leu Thr Ile Phe Ala Val Leu Gly Ile Leu Ile Thr
620             625             630             635

tcc ttc gtg ctg ggg gtc ttc atc aag ttc agg aac act ccc atc gtg    2391
Ser Phe Val Leu Gly Val Phe Ile Lys Phe Arg Asn Thr Pro Ile Val
            640             645             650

aag gcc acc aac cgg gag ttg tcc tac ctg ctg ctc ttc tcc ctc atc    2439
Lys Ala Thr Asn Arg Glu Leu Ser Tyr Leu Leu Leu Phe Ser Leu Ile
            655             660             665

tgc tgc ttc tcc agc tcg ctc atc ttc atc ggc gag ccc agg gac tgg    2487
Cys Cys Phe Ser Ser Ser Leu Ile Phe Ile Gly Glu Pro Arg Asp Trp
        670             675             680

acc tgt cgg ctc cgc caa ccg gcc ttt ggc atc agc ttc gtc ctg tgc    2535
Thr Cys Arg Leu Arg Gln Pro Ala Phe Gly Ile Ser Phe Val Leu Cys
        685             690             695

atc tcc tgc atc ctg gtg aag acc aac cgg gtg ctg ctg gtc ttc gag    2583
Ile Ser Cys Ile Leu Val Lys Thr Asn Arg Val Leu Leu Val Phe Glu
700             705             710             715

gcc aag atc ccc acc agc ctc cac cgc aag tgg gtg ggc ctc aac ctg    2631
Ala Lys Ile Pro Thr Ser Leu His Arg Lys Trp Val Gly Leu Asn Leu
            720             725             730

cag ttc ctc ctg gtc ttc ctc tgc atc ctg gtg caa atc gtc acc tgc    2679
Gln Phe Leu Leu Val Phe Leu Cys Ile Leu Val Gln Ile Val Thr Cys
            735             740             745

atc atc tgg ctc tac acc gcg cct ccc tcc agc tac agg aac cat gag    2727
Ile Ile Trp Leu Tyr Thr Ala Pro Pro Ser Ser Tyr Arg Asn His Glu
        750             755             760

ctg gag gac gag gtc atc ttc atc acc tgc gac gag ggc tcg ctc atg    2775
Leu Glu Asp Glu Val Ile Phe Ile Thr Cys Asp Glu Gly Ser Leu Met
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    Leu Glu Asp Glu Val Ile Phe Ile Thr Cys Asp Glu Gly Ser Leu Met
        765                 770                 775

gcg ctg ggc ttc ctc atc ggc tac acc tgc ctc ctc gcc gcc atc tgc    2823
Ala Leu Gly Phe Leu Ile Gly Tyr Thr Cys Leu Leu Ala Ala Ile Cys
780                 785                 790                 795

ttc ttc ttc gcc ttc aag tcc cgt aag ctg ccg gag aac ttc aac gag    2871
Phe Phe Phe Ala Phe Lys Ser Arg Lys Leu Pro Glu Asn Phe Asn Glu
                800                 805                 810

gct aag ttc atc acc ttc agc atg ttg atc ttc ttc atc gtc tgg atc    2919
Ala Lys Phe Ile Thr Phe Ser Met Leu Ile Phe Phe Ile Val Trp Ile
            815                 820                 825

tcc ttc atc ccc gcc tat gtc agc acc tac ggc aag ttt gtg tcg gcc    2967
Ser Phe Ile Pro Ala Tyr Val Ser Thr Tyr Gly Lys Phe Val Ser Ala
            830                 835                 840

gtg gag gtg att gcc atc ctg gcc tcc agc ttc ggg ctg ctg ggc tgc    3015
Val Glu Val Ile Ala Ile Leu Ala Ser Ser Phe Gly Leu Leu Gly Cys
        845                 850                 855

att tac ttc aac aag tgt tac atc atc ctg ttc aag ccg tgc cgt aac    3063
Ile Tyr Phe Asn Lys Cys Tyr Ile Ile Leu Phe Lys Pro Cys Arg Asn
860                 865                 870                 875

acc atc gag gag gtg cgc tgc agc acg gcg gcc cac gcc ttc aag gtg    3111
Thr Ile Glu Glu Val Arg Cys Ser Thr Ala Ala His Ala Phe Lys Val
                880                 885                 890

gcg gcc cgg gcc acc ctc cgg cgc agc gcc gcg tct cgc aag cgc tcc    3159
Ala Ala Arg Ala Thr Leu Arg Arg Ser Ala Ala Ser Arg Lys Arg Ser
            895                 900                 905

agc agc ctg tgc ggc tcc acc atc tcc tcg ccc gcc tcg tcc acc tgc    3207
Ser Ser Leu Cys Gly Ser Thr Ile Ser Ser Pro Ala Ser Ser Thr Cys
        910                 915                 920

ggg ccg ggc ctc acc atg gag atg cag cgc tgc agc acg cag aag gtc    3255
Gly Pro Gly Leu Thr Met Glu Met Gln Arg Cys Ser Thr Gln Lys Val
    925                 930                 935

agc ttc ggc agc ggc acc gtc acc ctg tcg ctc agc ttc gag gag aca    3303
Ser Phe Gly Ser Gly Thr Val Thr Leu Ser Leu Ser Phe Glu Glu Thr
940                 945                 950                 955

ggc cga tac gcc acc ctc agc cgc acg gcc cgc agc agg aac tcg gcg    3351
Gly Arg Tyr Ala Thr Leu Ser Arg Thr Ala Arg Ser Arg Asn Ser Ala
            960                 965                 970

gat ggc cgc agc ggc gac gac ctg cca tct aga cac cac gac cag ggc    3399
Asp Gly Arg Ser Gly Asp Asp Leu Pro Ser Arg His His Asp Gln Gly
            975                 980                 985

ccg cct cag aaa tgc gag ccc cag ccc gcc aac gat gcc cga tac aag    3447
Pro Pro Gln Lys Cys Glu Pro Gln Pro Ala Asn Asp Ala Arg Tyr Lys
        990                 995                 1000
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gcg gcg ccg acc aag ggc acc cta gag tcg ccg ggc ggc agc aag gag    3495
Ala Ala Pro Thr Lys Gly Thr Leu Glu Ser Pro Gly Gly Ser Lys Glu
    1005            1010            1015

cgc ccc aca act atg gag gaa acc taa tccaactcct ccatcaaccc          3542
Arg Pro Thr Thr Met Glu Glu Thr  *
1020            1025

caagaacatc ctccacggca gcaccgtcga caactgacat caactcctaa ccggtggctg  3602
cccaacctct cccctctccg gcactttgcg ttttgctgaa gattgcagca tctgcagttc  3662
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gcaacaggaa tataatgact gtaacaaaaa aattgttgat tatcttaaaa atgcaaattg  4022
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        20              25              30
Lys Gly Asp Ile Ile Leu Gly Gly Leu Phe Pro Ile His Phe Gly Val
        35              40              45
Ala Ala Lys Asp Gln Asp Leu Lys Ser Arg Pro Glu Ala Thr Lys Cys
    50              55              60
Ile Arg Tyr Asn Phe Arg Gly Phe Arg Trp Leu Gln Ala Met Ile Phe
65              70              75              80
Ala Ile Glu Glu Ile Asn Asn Ser Met Thr Phe Leu Pro Asn Ile Thr
            85              90              95
Leu Gly Tyr Arg Ile Phe Asp Thr Cys Asn Thr Val Ser Lys Ala Leu
            100             105             110
Glu Ala Thr Leu Ser Phe Val Ala Gln Asn Lys Ile Asp Ser Leu Asn
        115             120             125
Leu Asp Glu Phe Cys Asn Cys Ser Asp His Ile Pro Ser Thr Ile Ala
    130             135             140
Val Val Gly Ala Thr Gly Ser Gly Ile Ser Thr Ala Val Ala Asn Leu
145             150             155             160
Leu Gly Leu Phe Tyr Ile Pro Gln Val Ser Tyr Ala Ser Ser Ser Arg
            165             170             175
Leu Leu Ser Asn Lys Asn Glu Tyr Lys Ala Phe Leu Arg Thr Ile Pro
            180             185             190
Asn Asp Glu Gln Gln Ala Thr Ala Met Ala Glu Ile Ile Glu His Phe
        195             200             205
Gln Trp Asn Trp Val Gly Thr Leu Ala Ala Asp Asp Asp Tyr Gly Arg
    210             215             220
Pro Gly Ile Asp Lys Phe Arg Glu Glu Ala Val Lys Arg Asp Ile Cys
225             230             235             240
Ile Asp Phe Ser Glu Met Ile Ser Gln Tyr Tyr Thr Gln Lys Gln Leu
            245             250             255
Glu Phe Ile Ala Asp Val Ile Gln Asn Ser Ser Ala Lys Val Ile Val
            260             265             270
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Val Phe Ser Asn Gly Pro Asp Leu Glu Pro Leu Ile Gln Glu Ile Val
          275   280   285
Arg Arg Asn Ile Thr Asp Arg Ile Trp Leu Ala Ser Glu Ala Trp Ala
    290   295   300
Ser Ser Ser Leu Ile Ala Lys Pro Glu Tyr Phe His Val Val Gly Gly
305   310   315   320
Thr Ile Gly Phe Ala Leu Arg Ala Gly Arg Ile Pro Gly Phe Asn Lys
              325   330   335
Phe Leu Lys Glu Val His Pro Ser Arg Ser Ser Asp Asn Gly Phe Val
          340   345   350
Lys Glu Phe Trp Glu Glu Thr Phe Asn Cys Tyr Phe Thr Glu Lys Thr
          355   360   365
Leu Thr Gln Leu Lys Asn Ser Lys Val Pro Ser His Gly Pro Ala Ala
    370   375   380
Gln Gly Asp Gly Ser Lys Ala Gly Asn Ser Arg Arg Thr Ala Leu Arg
385   390   395   400
His Pro Cys Thr Gly Glu Glu Asn Ile Thr Ser Val Glu Thr Pro Tyr
              405   410   415
Leu Asp Tyr Thr His Leu Arg Ile Ser Tyr Asn Val Tyr Val Ala Val
              420   425   430
Tyr Ser Ile Ala His Ala Leu Gln Asp Ile His Ser Cys Lys Pro Gly
          435   440   445
Thr Gly Ile Phe Ala Asn Gly Ser Cys Ala Asp Ile Lys Lys Val Glu
    450   455   460
Ala Trp Gln Val Leu Asn His Leu Leu His Leu Lys Phe Thr Asn Ser
465   470   475   480
Met Gly Glu Gln Val Asp Phe Asp Asp Gln Gly Asp Leu Lys Gly Asn
              485   490   495
Tyr Thr Ile Ile Asn Trp Gln Leu Ser Ala Glu Asp Glu Ser Val Leu
          500   505   510
Phe His Glu Val Gly Asn Tyr Asn Ala Tyr Ala Lys Pro Ser Asp Arg
          515   520   525
Leu Asn Ile Asn Glu Lys Lys Ile Leu Trp Ser Gly Phe Ser Lys Val
    530   535   540
Val Pro Phe Ser Asn Cys Ser Arg Asp Cys Val Pro Gly Thr Arg Lys
545   550   555   560
Gly Ile Ile Glu Gly Glu Pro Thr Cys Cys Phe Glu Cys Met Ala Cys
              565   570   575
Ala Glu Gly Glu Phe Ser Asp Glu Asn Asp Ala Ser Ala Cys Thr Lys
              580   585   590
Cys Pro Asn Asp Phe Trp Ser Asn Glu Asn His Thr Ser Cys Ile Ala
    595   600   605
Lys Glu Ile Glu Tyr Leu Ser Trp Thr Glu Pro Phe Gly Ile Ala Leu
    610   615   620
Thr Ile Phe Ala Val Leu Gly Ile Leu Ile Thr Ser Phe Val Leu Gly
625   630   635   640
Val Phe Ile Lys Phe Arg Asn Thr Pro Ile Val Lys Ala Thr Asn Arg
              645   650   655
Glu Leu Ser Tyr Leu Leu Leu Phe Ser Leu Ile Cys Cys Phe Ser Ser
          660   665   670
Ser Leu Ile Phe Ile Gly Glu Pro Arg Asp Trp Thr Cys Arg Leu Arg
          675   680   685
Gln Pro Ala Phe Gly Ile Ser Phe Val Leu Cys Ile Ser Cys Ile Leu
    690   695   700
Val Lys Thr Asn Arg Val Leu Leu Val Phe Glu Ala Lys Ile Pro Thr
705   710   715   720
Ser Leu His Arg Lys Trp Val Gly Leu Asn Leu Gln Phe Leu Leu Val
              725   730   735
Phe Leu Cys Ile Leu Val Gln Ile Val Thr Cys Ile Ile Trp Leu Tyr

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               740                      745                       750
Thr Ala Pro Pro Ser Ser Tyr Arg Asn His Glu Leu Glu Asp Glu Val
        755                  760                  765
Ile Phe Ile Thr Cys Asp Glu Gly Ser Leu Met Ala Leu Gly Phe Leu
    770                  775                  780
Ile Gly Tyr Thr Cys Leu Leu Ala Ala Ile Cys Phe Phe Phe Ala Phe
785                  790                  795                  800
Lys Ser Arg Lys Leu Pro Glu Asn Phe Asn Glu Ala Lys Phe Ile Thr
            805                  810                  815
Phe Ser Met Leu Ile Phe Phe Ile Val Trp Ile Ser Phe Ile Pro Ala
        820                  825                  830
Tyr Val Ser Thr Tyr Gly Lys Phe Val Ser Ala Val Glu Val Ile Ala
        835                  840                  845
Ile Leu Ala Ser Ser Phe Gly Leu Leu Gly Cys Ile Tyr Phe Asn Lys
    850                  855                  860
Cys Tyr Ile Ile Leu Phe Lys Pro Cys Arg Asn Thr Ile Glu Glu Val
865                  870                  875                  880
Arg Cys Ser Thr Ala Ala His Ala Phe Lys Val Ala Ala Arg Ala Thr
            885                  890                  895
Leu Arg Arg Ser Ala Ala Ser Arg Lys Arg Ser Ser Ser Leu Cys Gly
        900                  905                  910
Ser Thr Ile Ser Ser Pro Ala Ser Ser Thr Cys Gly Pro Gly Leu Thr
        915                  920                  925
Met Glu Met Gln Arg Cys Ser Thr Gln Lys Val Ser Phe Gly Ser Gly
    930                  935                  940
Thr Val Thr Leu Ser Leu Ser Phe Glu Glu Thr Gly Arg Tyr Ala Thr
945                  950                  955                  960
Leu Ser Arg Thr Ala Arg Ser Arg Asn Ser Ala Asp Gly Arg Ser Gly
            965                  970                  975
Asp Asp Leu Pro Ser Arg His His Asp Gln Gly Pro Pro Gln Lys Cys
            980                  985                  990
Glu Pro Gln Pro Ala Asn Asp Ala Arg Tyr Lys Ala Ala Pro Thr Lys
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Gly Thr Leu Glu Ser Pro Gly Gly Ser Lys Glu Arg Pro Thr Thr Met
    1010                 1015                 1020
Glu Glu Thr
1025
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Leu Leu Val Ile Trp Ile Ala Ala Asp Asp Asp Tyr Gly Arg Pro Gly
 1               5                   10                  15

ata gat aag ttt cga gaa gaa gct gaa gag agg gac atc tgc ata gat     96
Ile Asp Lys Phe Arg Glu Glu Ala Glu Glu Arg Asp Ile Cys Ile Asp
                20                  25                  30

ttc aat gag atg att tct cag tac tat aca caa aaa gag ctg gag ttt    144
Phe Asn Glu Met Ile Ser Gln Tyr Tyr Thr Gln Lys Glu Leu Glu Phe
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              35                        40                        45
att gca gat act att cag aat tcc tca gcc aaa gtg att gty gtc ttc    192
Ile Ala Asp Thr Ile Gln Asn Ser Ser Ala Lys Val Ile Xaa Val Phe
        50                        55                    60

tca aat ggc cct gac ttg gaa cca cta ata caa gag ata gtt cga cgg    240
Ser Asn Gly Pro Asp Leu Glu Pro Leu Ile Gln Glu Ile Val Arg Arg
    65                        70                    75            80

aac ata act gat aga ata tgg cta gca agt gaa gcg tgg gct agt tcc    288
Asn Ile Thr Asp Arg Ile Trp Leu Ala Ser Glu Ala Trp Ala Ser Ser
                        85                    90                95

tca ctg ata gcc aaa cca gaa tac ttc cat gtt gtt ggt gga acc att    336
Ser Leu Ile Ala Lys Pro Glu Tyr Phe His Val Val Gly Gly Thr Ile
                100                        105                110

gga ttt gca cta aga gca gga cgc atc cca gga ttc cat gag ttt tta    384
Gly Phe Ala Leu Arg Ala Gly Arg Ile Pro Gly Phe His Glu Phe Leu
            115                        120                125

aaa aag gtc cat ccc agc agg tcc tcc cac aat ggc ttt gtc aag gaa    432
Lys Lys Val His Pro Ser Arg Ser Ser His Asn Gly Phe Val Lys Glu
        130                        135                140

ttc tgg gaa gaa aca ttt aat tgt tat ttc act gaa gaa tcc cta aca    480
Phe Trp Glu Glu Thr Phe Asn Cys Tyr Phe Thr Glu Glu Ser Leu Thr
145                        150                        155            160

caa cta aag aat tgc aaa aca cca acc cat gga tta gca atg cac aat    528
Gln Leu Lys Asn Cys Lys Thr Pro Thr His Gly Leu Ala Met His Asn
                        165                        170                175

gac agt gcg aaa atg ggg cat tcc aca agg aca acg tta cga cct cca    576
Asp Ser Ala Lys Met Gly His Ser Thr Arg Thr Thr Leu Arg Pro Pro
                180                        185                190

tgc act gga gaa gag aat atc acg agt gtg gag acc cct tac ctg gat    624
Cys Thr Gly Glu Glu Asn Ile Thr Ser Val Glu Thr Pro Tyr Leu Asp
            195                        200                205

tat act cac ctc cgt att tca tat aat gtg tat gtg gca gtg tat tcg    672
Tyr Thr His Leu Arg Ile Ser Tyr Asn Val Tyr Val Ala Val Tyr Ser
        210                        215                220

att gct cac gct ctg cag gac atc tat gcc tgc aca cct ggg aag ggg    720
Ile Ala His Ala Leu Gln Asp Ile Tyr Ala Cys Thr Pro Gly Lys Gly
225                        230                        235                240

att ttt gcg aac gga tca tgt gcc gat atc aaa aaa gtc gaa gcc tgg    768
Ile Phe Ala Asn Gly Ser Cys Ala Asp Ile Lys Lys Val Glu Ala Trp
                245                        250                        255

aat cca tat gac tag t                                                784
Asn Pro Tyr Asp  *
                260
```

<210> 4
<211> 260
<212> PRT
<213> squalus acanthias

<400> 4
Leu Leu Val Ile Trp Ile Ala Ala Asp Asp Asp Tyr Gly Arg Pro Gly
1   5   10   15
Ile Asp Lys Phe Arg Glu Glu Ala Glu Glu Arg Asp Ile Cys Ile Asp
                20   25   30
Phe Asn Glu Met Ile Ser Gln Tyr Tyr Thr Gln Lys Glu Leu Glu Phe
            35   40   45
Ile Ala Asp Thr Ile Gln Asn Ser Ser Ala Lys Val Ile Val Val Phe
        50   55   60
Ser Asn Gly Pro Asp Leu Glu Pro Leu Ile Gln Glu Ile Val Arg Arg
65   70   75   80
Asn Ile Thr Asp Arg Ile Trp Leu Ala Ser Glu Ala Trp Ala Ser Ser
                85   90   95
Ser Leu Ile Ala Lys Pro Glu Tyr Phe His Val Val Gly Gly Thr Ile
                100   105   110
Gly Phe Ala Leu Arg Ala Gly Arg Ile Pro Gly Phe His Glu Phe Leu
            115   120   125
Lys Lys Val His Pro Ser Arg Ser Ser His Asn Gly Phe Val Lys Glu
        130   135   140
Phe Trp Glu Glu Thr Phe Asn Cys Tyr Phe Thr Glu Glu Ser Leu Thr
145   150   155   160
Gln Leu Lys Asn Cys Lys Thr Pro Thr His Gly Leu Ala Met His Asn
                165   170   175
Asp Ser Ala Lys Met Gly His Ser Thr Arg Thr Thr Leu Arg Pro Pro
                180   185   190
Cys Thr Gly Glu Glu Asn Ile Thr Ser Val Glu Thr Pro Tyr Leu Asp
            195   200   205
Tyr Thr His Leu Arg Ile Ser Tyr Asn Val Tyr Val Ala Val Tyr Ser
        210   215   220
Ile Ala His Ala Leu Gln Asp Ile Tyr Ala Cys Thr Pro Gly Lys Gly
225   230   235   240
Ile Phe Ala Asn Gly Ser Cys Ala Asp Ile Lys Lys Val Glu Ala Trp
                245   250   255
Asn Pro Tyr Asp
            260

<210> 5
<211> 598
<212> DNA
<213> squalus acanthias

<220>
<221> CDS
<222> (3)...(598)

<400> 5
tt ctg aca ata ttt gct gtg cta gga ata ctg atc act tcc ttt gtt   47
   Leu Thr Ile Phe Ala Val Leu Gly Ile Leu Ile Thr Ser Phe Val
   1   5   10   15

ttg gga gta ttc att aag ttc aga aat act cct att gtg aaa gcc act   95
Leu Gly Val Phe Ile Lys Phe Arg Asn Thr Pro Ile Val Lys Ala Thr
                20   25   30

```
aac aga gaa ctc tcc tat ctc ctc ctc ttc tcc tta atc tgc tgt ttc    143
Asn Arg Glu Leu Ser Tyr Leu Leu Leu Phe Ser Leu Ile Cys Cys Phe
        35                  40                  45

tcc agc tca ttg atc ttc att gga gaa ccc aaa gat tgg acc tgc aga    191
Ser Ser Ser Leu Ile Phe Ile Gly Glu Pro Lys Asp Trp Thr Cys Arg
            50                  55                  60

ctg cgt caa cct gca ttt gga atc agc ttt gtg ctg tgc att tct tgc    239
Leu Arg Gln Pro Ala Phe Gly Ile Ser Phe Val Leu Cys Ile Ser Cys
        65                  70                  75

att ctg gtg aaa act aat cgt gtg cta ttg gtc ttt gag gcc aag atc    287
Ile Leu Val Lys Thr Asn Arg Val Leu Leu Val Phe Glu Ala Lys Ile
80                  85                  90                  95

cca act agc ctc cat cga aag tgg gtg ggc ctc aat ttg caa ttc tta    335
Pro Thr Ser Leu His Arg Lys Trp Val Gly Leu Asn Leu Gln Phe Leu
                100                 105                 110

ctg gtt ttc ctc tgt att ctt gtg caa att gtt act tgt gtc atc tgg    383
Leu Val Phe Leu Cys Ile Leu Val Gln Ile Val Thr Cys Val Ile Trp
            115                 120                 125

ctt tac aca gca ccc cct tcg agc tac aga aat cat gaa cta gaa gat    431
Leu Tyr Thr Ala Pro Pro Ser Ser Tyr Arg Asn His Glu Leu Glu Asp
        130                 135                 140

gaa atc att ttt att aca tgt gat gaa ggt tcc tta atg gca ctt ggt    479
Glu Ile Ile Phe Ile Thr Cys Asp Glu Gly Ser Leu Met Ala Leu Gly
        145                 150                 155

ttt ctc att ggt tac aca tgc ctc ctt gct gcc att tgc ttc ttt ttt    527
Phe Leu Ile Gly Tyr Thr Cys Leu Leu Ala Ala Ile Cys Phe Phe Phe
160                 165                 170                 175

gcc ttt aag tct cgc aaa ctc cca gag aac ttc aat gag gcc aaa ttt    575
Ala Phe Lys Ser Arg Lys Leu Pro Glu Asn Phe Asn Glu Ala Lys Phe
                180                 185                 190

att acc ttc agc atg ctg ata tt                                     598
Ile Thr Phe Ser Met Leu Ile
                195
```

```
<210> 6
<211> 198
<212> PRT
<213> squalus acanthias

<400> 6
Leu Thr Ile Phe Ala Val Leu Gly Ile Leu Ile Thr Ser Phe Val Leu
1               5                   10                  15
Gly Val Phe Ile Lys Phe Arg Asn Thr Pro Ile Val Lys Ala Thr Asn
            20                  25                  30
Arg Glu Leu Ser Tyr Leu Leu Leu Phe Ser Leu Ile Cys Cys Phe Ser
        35                  40                  45
Ser Ser Leu Ile Phe Ile Gly Glu Pro Lys Asp Trp Thr Cys Arg Leu
```

```
        50                      55                      60
    Arg Gln Pro Ala Phe Gly Ile Ser Phe Val Leu Cys Ile Ser Cys Ile
    65                      70                      75                      80
    Leu Val Lys Thr Asn Arg Val Leu Leu Val Phe Glu Ala Lys Ile Pro
                        85                      90                      95
    Thr Ser Leu His Arg Lys Trp Val Gly Leu Asn Leu Gln Phe Leu Leu
                    100                     105                     110
    Val Phe Leu Cys Ile Leu Val Gln Ile Val Thr Cys Val Ile Trp Leu
                    115                     120                     125
    Tyr Thr Ala Pro Pro Ser Ser Tyr Arg Asn His Glu Leu Glu Asp Glu
                130                     135                     140
    Ile Ile Phe Ile Thr Cys Asp Glu Gly Ser Leu Met Ala Leu Gly Phe
    145                     150                     155                     160
    Leu Ile Gly Tyr Thr Cys Leu Leu Ala Ala Ile Cys Phe Phe Phe Ala
                        165                     170                     175
    Phe Lys Ser Arg Lys Leu Pro Glu Asn Phe Asn Glu Ala Lys Phe Ile
                    180                     185                     190
    Thr Phe Ser Met Leu Ile
                    195
```

<210> 7
<211> 594
<212> DNA
<213> psuedupleuronecies americanus

<220>
<221> CDS
<222> (2)...(592)

<400> 7

```
g ttg acc ata tgt gca gtg ctg ggt gtt gcc ytg acg ggc ttc gtg atg   49
  Leu Thr Ile Cys Ala Val Leu Gly Val Ala Xaa Thr Gly Phe Val Met
   1               5                       10                      15

gcc gtc ttt gtc cga ttc cgc aac acc cca ata gtg aaa gcc acg aac    97
Ala Val Phe Val Arg Phe Arg Asn Thr Pro Ile Val Lys Ala Thr Asn
                20                      25                      30

cga gaa ctg tcc tac gtc ctc ctg ttc tct ctc atc tgt tgc ttc tcc   145
Arg Glu Leu Ser Tyr Val Leu Leu Phe Ser Leu Ile Cys Cys Phe Ser
            35                      40                      45

agc tcc ctc atc ttc ata gga gag ccg cag gat tgg atg tgc cgc tta   193
Ser Ser Leu Ile Phe Ile Gly Glu Pro Gln Asp Trp Met Cys Arg Leu
        50                      55                      60

cgc caa ccg gcc ttt ggg atc agt ttt gtt ctc tgt atc tcg tgc atc   241
Arg Gln Pro Ala Phe Gly Ile Ser Phe Val Leu Cys Ile Ser Cys Ile
65                      70                      75                      80

ctt gtg aaa aca aac cka gtc ctc ttg gtg ttt gaa gcc aag atc ccg   289
Leu Val Lys Thr Asn Xaa Val Leu Leu Val Phe Glu Ala Lys Ile Pro
                    85                      90                      95

aca agt ctc cat cgt aaa tgg tgg ggg tta aac cta cag ttc ctg ctg   337
Thr Ser Leu His Arg Lys Trp Trp Gly Leu Asn Leu Gln Phe Leu Leu
                100                     105                     110
```

```
gtg ttt ctg tgc aca ttt gtc caa gtc atg ata tgt gtg gtc tgg ctg      385
Val Phe Leu Cys Thr Phe Val Gln Val Met Ile Cys Val Val Trp Leu
        115                 120                 125

tac aac gcc cca cct tcc agt tac agg aat tat gac ata gat gag atg      433
Tyr Asn Ala Pro Pro Ser Ser Tyr Arg Asn Tyr Asp Ile Asp Glu Met
        130                 135                 140

att ttt atc aca tgt aat gaa ggc tct gta atg gct ctt ggg ttt ctt      481
Ile Phe Ile Thr Cys Asn Glu Gly Ser Val Met Ala Leu Gly Phe Leu
145                 150                 155                 160

att ggc tat aca tgc ctg ctg gcc gct ata tgt ttc ttc ttt gca ttc      529
Ile Gly Tyr Thr Cys Leu Leu Ala Ala Ile Cys Phe Phe Phe Ala Phe
                165                 170                 175

aaa tca cgg aaa ctt cca gaa aac ttc acc gag gct aag ttc atc act      577
Lys Ser Arg Lys Leu Pro Glu Asn Phe Thr Glu Ala Lys Phe Ile Thr
                180                 185                 190

ttt agt atg ctc ata tt                                               594
Phe Ser Met Leu Ile
        195
```

<210> 8
<211> 197
<212> PRT
<213> psuedupleuronecies americanus

<220>
<221> VARIANT
<222> (1)...(197)
<223> Xaa = Any Amino Acid

<400> 8
```
Leu Thr Ile Cys Ala Val Leu Gly Val Ala Leu Thr Gly Phe Val Met
1               5                   10                  15
Ala Val Phe Val Arg Phe Arg Asn Thr Pro Ile Val Lys Ala Thr Asn
                20                  25                  30
Arg Glu Leu Ser Tyr Val Leu Leu Phe Ser Leu Ile Cys Phe Ser
        35                  40                  45
Ser Ser Leu Ile Phe Ile Gly Glu Pro Gln Asp Trp Met Cys Arg Leu
        50                  55                  60
Arg Gln Pro Ala Phe Gly Ile Ser Phe Val Leu Cys Ile Ser Cys Ile
65                  70                  75                  80
Leu Val Lys Thr Asn Xaa Val Leu Leu Val Phe Glu Ala Lys Ile Pro
                85                  90                  95
Thr Ser Leu His Arg Lys Trp Trp Gly Leu Asn Leu Gln Phe Leu Leu
        100                 105                 110
Val Phe Leu Cys Thr Phe Val Gln Val Met Ile Cys Val Val Trp Leu
        115                 120                 125
Tyr Asn Ala Pro Pro Ser Ser Tyr Arg Asn Tyr Asp Ile Asp Glu Met
        130                 135                 140
Ile Phe Ile Thr Cys Asn Glu Gly Ser Val Met Ala Leu Gly Phe Leu
145                 150                 155                 160
Ile Gly Tyr Thr Cys Leu Leu Ala Ala Ile Cys Phe Phe Phe Ala Phe
                165                 170                 175
Lys Ser Arg Lys Leu Pro Glu Asn Phe Thr Glu Ala Lys Phe Ile Thr
```

```
                  180                    185                      190
      Phe Ser Met Leu Ile
                195
```

<210> 9
<211> 475
<212> DNA
<213> paralichthus dentalus

<220>
<221> CDS
<222> (3)...(473)

<400> 9
```
tg tcg tgg acg gag ccc ttt ggg atc gcg ttg gcc ata tgt gca gcg        47
   Ser Trp Thr Glu Pro Phe Gly Ile Ala Leu Ala Ile Cys Ala Ala
    1               5                   10                  15

ctg ggt gtt gcc ttg acg ggc ttc gtg atg gcc gtc ttt atc aga ttc       95
Leu Gly Val Ala Leu Thr Gly Phe Val Met Ala Val Phe Ile Arg Phe
                20                  25                  30

cgc aac acc cca ata gtg aag gcc acg aac cga gaa ctg tcc tat gtc      143
Arg Asn Thr Pro Ile Val Lys Ala Thr Asn Arg Glu Leu Ser Tyr Val
            35                  40                  45

ctc ctg ttc tct ctc atc tgt tgc ttc tcc agt tcc ctc atc ttt att      191
Leu Leu Phe Ser Leu Ile Cys Cys Phe Ser Ser Ser Leu Ile Phe Ile
        50                  55                  60

gga gag ccg cag gat tgg atg tgt cgt tta cgc caa cct gcc ttt ggg      239
Gly Glu Pro Gln Asp Trp Met Cys Arg Leu Arg Gln Pro Ala Phe Gly
    65                  70                  75

atc agt ttt gtt ctc tgt atc tcc tgc atc ctt gtg aaa act aat aga      287
Ile Ser Phe Val Leu Cys Ile Ser Cys Ile Leu Val Lys Thr Asn Arg
80                  85                  90                  95

gta ctc tta gta ttt gaa gcc aag atc ccc aca agt ctc cat cgt aaa      335
Val Leu Leu Val Phe Glu Ala Lys Ile Pro Thr Ser Leu His Arg Lys
                100                 105                 110

tgg tgg ggg tta aac ctt cag ttt ttg ctg gtg ttt ctg tgc aca ttt      383
Trp Trp Gly Leu Asn Leu Gln Phe Leu Leu Val Phe Leu Cys Thr Phe
            115                 120                 125

gtc caa gtc atg atc tgt gtt gtc tgg ctg tac aat gcc cct ccc tcc      431
Val Gln Val Met Ile Cys Val Val Trp Leu Tyr Asn Ala Pro Pro Ser
        130                 135                 140

agt tac agg aat tat gac ata gat gag atg att ttt atc aca             473
Ser Tyr Arg Asn Tyr Asp Ile Asp Glu Met Ile Phe Ile Thr
    145                 150                 155

tg                                                                    475
```

<210> 10
<211> 157

<212> PRT
<213> paralichthus dentalus

<400> 10

```
Ser Trp Thr Glu Pro Phe Gly Ile Ala Leu Ala Ile Cys Ala Ala Leu
1               5                   10                  15
Gly Val Ala Leu Thr Gly Phe Val Met Ala Val Phe Ile Arg Phe Arg
                20                  25                  30
Asn Thr Pro Ile Val Lys Ala Thr Asn Arg Glu Leu Ser Tyr Val Leu
            35                  40                  45
Leu Phe Ser Leu Ile Cys Cys Phe Ser Ser Ser Leu Ile Phe Ile Gly
        50                  55                  60
Glu Pro Gln Asp Trp Met Cys Arg Leu Arg Gln Pro Ala Phe Gly Ile
65                  70                  75                  80
Ser Phe Val Leu Cys Ile Ser Cys Ile Leu Val Lys Thr Asn Arg Val
                85                  90                  95
Leu Leu Val Phe Glu Ala Lys Ile Pro Thr Ser Leu His Arg Lys Trp
                100                 105                 110
Trp Gly Leu Asn Leu Gln Phe Leu Leu Val Phe Leu Cys Thr Phe Val
            115                 120                 125
Gln Val Met Ile Cys Val Val Trp Leu Tyr Asn Ala Pro Pro Ser Ser
        130                 135                 140
Tyr Arg Asn Tyr Asp Ile Asp Glu Met Ile Phe Ile Thr
145                 150                     155
```

<210> 11
<211> 1308
<212> DNA
<213> cyclopterus lumpus

<220>
<221> CDS
<222> (2)...(1306)

<400> 11

```
a cgc cca ggg att gaa aaa ttt gag aag gag atg gag gag cga gac atc  49
  Arg Pro Gly Ile Glu Lys Phe Glu Lys Glu Met Glu Glu Arg Asp Ile
  1               5                   10                  15

tgc att cac ctt aat gaa ctt atc tct cag tat ttt gag gay cat gaa  97
Cys Ile His Leu Asn Glu Leu Ile Ser Gln Tyr Phe Glu Asp His Glu
                20                  25                  30

atc caa gcg ctg gct gac agg att gag aac tcc aca gct aaa gtc atc  145
Ile Gln Ala Leu Ala Asp Arg Ile Glu Asn Ser Thr Ala Lys Val Ile
            35                  40                  45

gta gtg ttt gcc agc ggc cca gat atc gag cct tta atc aaa gag atg  193
Val Val Phe Ala Ser Gly Pro Asp Ile Glu Pro Leu Ile Lys Glu Met
        50                  55                  60

gtg agg aga aac atc aca gac cgt atc tgg tta gcc agt gaa gcg tgg  241
Val Arg Arg Asn Ile Thr Asp Arg Ile Trp Leu Ala Ser Glu Ala Trp
65                  70                  75                  80

gct agc tcc tct ctt ata gct aaa cca gag tat ctt gat gtt gtg gct  289
Ala Ser Ser Ser Leu Ile Ala Lys Pro Glu Tyr Leu Asp Val Val Ala
                85                  90                  95
```

```
ggg act atc ggc ttt gct ctc aag gca ggg cat att cct ggc tta aga    337
Gly Thr Ile Gly Phe Ala Leu Lys Ala Gly His Ile Pro Gly Leu Arg
            100             105         `       110

gag ttc cta cag caa gtg caa cca aag aga gac agt cat aat gaa ttt    385
Glu Phe Leu Gln Gln Val Gln Pro Lys Arg Asp Ser His Asn Glu Phe
        115             120             125

gtc agg gag ttt tgg gaa gaa acc ttc aac tgt tat ctg gaa gac agc    433
Val Arg Glu Phe Trp Glu Glu Thr Phe Asn Cys Tyr Leu Glu Asp Ser
    130             135             140

cag aga cag cag gaa agt gag aat ggc agc aca agt ttc agg cct ttg    481
Gln Arg Gln Gln Glu Ser Glu Asn Gly Ser Thr Ser Phe Arg Pro Leu
145             150             155             160

tgt act ggt gag gaa gac atc aca agt gtt gag acc ccg tac ttg gac    529
Cys Thr Gly Glu Glu Asp Ile Thr Ser Val Glu Thr Pro Tyr Leu Asp
                165             170             175

tac aca cac ttt cgt atc tcc tat aac gtg tat gtt gca gtt tat tcc    577
Tyr Thr His Phe Arg Ile Ser Tyr Asn Val Tyr Val Ala Val Tyr Ser
                180             185             190

att gca cag gcc ctg cag gac ata ctc acc tgc aca cct gga cat gga    625
Ile Ala Gln Ala Leu Gln Asp Ile Leu Thr Cys Thr Pro Gly His Gly
        `195             200             205

ctc ttt gcc aac aat tcc tgt gcc gat ata aag aaa atg gaa gca tgg    673
Leu Phe Ala Asn Asn Ser Cys Ala Asp Ile Lys Lys Met Glu Ala Trp
    210             215             220

cag gcc ctg aag cag ctt aga cat ttg aac tac acc aac agc atg ggg    721
Gln Ala Leu Lys Gln Leu Arg His Leu Asn Tyr Thr Asn Ser Met Gly
225             230             235             240

gaa aag atg cac ttt gat gag aac tca gac atg gca tca aac tac acc    769
Glu Lys Met His Phe Asp Glu Asn Ser Asp Met Ala Ser Asn Tyr Thr
                245             250             255

att ata aac tgg cac cgg tct gct gag gat ggc tct gtg gtg ttt gag    817
Ile Ile Asn Trp His Arg Ser Ala Glu Asp Gly Ser Val Val Phe Glu
            260             265             270

gac gtg gga tac tac agc atg cac gtc aag aga gga gcc aaa ctg ttc    865
Asp Val Gly Tyr Tyr Ser Met His Val Lys Arg Gly Ala Lys Leu Phe
            275             280             285

att gac aag aca aag att ttg tgg aat gga tac agt tcg gag gcg cca    913
Ile Asp Lys Thr Lys Ile Leu Trp Asn Gly Tyr Ser Ser Glu Ala Pro
290             295             300

ttc tct aat tgc agt gag gac tgt gaa cct ggt aca agg aag ggg atc    961
Phe Ser Asn Cys Ser Glu Asp Cys Glu Pro Gly Thr Arg Lys Gly Ile
305             310             315             320

att gac agt atg ccc aca tgt tgc ttt gaa tgc act gag tgc tca gat   1009
Ile Asp Ser Met Pro Thr Cys Cys Phe Glu Cys Thr Glu Cys Ser Asp
```

```
                  325                    330                    335
gga gag tac agt aat cat aaa gat gcc agt gtt tgc acc aag tgt cca    1057
Gly Glu Tyr Ser Asn His Lys Asp Ala Ser Val Cys Thr Lys Cys Pro
            340                    345                    350

tat aac tct tgg tcc aat ggg aat cac aca ttc tgc ttc ctg aag gaa    1105
Tyr Asn Ser Trp Ser Asn Gly Asn His Thr Phe Cys Phe Leu Lys Glu
            355                    360                    365

atc gag ttt ctc tcc tgg aca gaa cca ttc ggg ata gct ttg gcc ata    1153
Ile Glu Phe Leu Ser Trp Thr Glu Pro Phe Gly Ile Ala Leu Ala Ile
            370                    375                    380

tgt gca gta ctg ggt gtg ctc ttg aca gct ttt gtg atc gga gtc ttt    1201
Cys Ala Val Leu Gly Val Leu Leu Thr Ala Phe Val Ile Gly Val Phe
385                    390                    395                    400

gtc aga ttc cgc aac acc cca ata gtg aag gcc aca aac cga gaa ctg    1249
Val Arg Phe Arg Asn Thr Pro Ile Val Lys Ala Thr Asn Arg Glu Leu
                405                    410                    415

tcc tac gtt ctc ctg twc tca ctt atc tgt tgc ttc tca agc tcc ctc    1297
Ser Tyr Val Leu Leu Xaa Ser Leu Ile Cys Cys Phe Ser Ser Ser Leu
            420                    425                    430

akc ttc atc gg                                                       1308
Xaa Phe Ile
        435
```

<210> 12
<211> 435
<212> PRT
<213> cyclopterus lumpus

<220>
<221> VARIANT
<222> (1)...(435)
<223> Xaa = Any Amino Acid

<400> 12
```
Arg Pro Gly Ile Glu Lys Phe Glu Lys Glu Met Glu Glu Arg Asp Ile
1               5                   10                  15
Cys Ile His Leu Asn Glu Leu Ile Ser Gln Tyr Phe Glu Asp His Glu
            20                  25                  30
Ile Gln Ala Leu Ala Asp Arg Ile Glu Asn Ser Thr Ala Lys Val Ile
            35                  40                  45
Val Val Phe Ala Ser Gly Pro Asp Ile Glu Pro Leu Ile Lys Glu Met
        50                  55                  60
Val Arg Arg Asn Ile Thr Asp Arg Ile Trp Leu Ala Ser Glu Ala Trp
65                  70                  75                  80
Ala Ser Ser Ser Leu Ile Ala Lys Pro Glu Tyr Leu Asp Val Val Ala
                85                  90                  95
Gly Thr Ile Gly Phe Ala Leu Lys Ala Gly His Ile Pro Gly Leu Arg
            100                 105                 110
Glu Phe Leu Gln Gln Val Gln Pro Lys Arg Asp Ser His Asn Glu Phe
            115                 120                 125
Val Arg Glu Phe Trp Glu Glu Thr Phe Asn Cys Tyr Leu Glu Asp Ser
```

```
          130                      135                      140
Gln Arg Gln Gln Glu Ser Glu Asn Gly Ser Thr Ser Phe Arg Pro Leu
145                      150                      155                  160
Cys Thr Gly Glu Glu Asp Ile Thr Ser Val Glu Thr Pro Tyr Leu Asp
                    165                  170                  175
Tyr Thr His Phe Arg Ile Ser Tyr Asn Val Tyr Val Ala Val Tyr Ser
                180                  185                  190
Ile Ala Gln Ala Leu Gln Asp Ile Leu Thr Cys Thr Pro Gly His Gly
            195                  200                  205
Leu Phe Ala Asn Asn Ser Cys Ala Asp Ile Lys Lys Met Glu Ala Trp
        210                  215                  220
Gln Ala Leu Lys Gln Leu Arg His Leu Asn Tyr Thr Asn Ser Met Gly
225                  230                  235                  240
Glu Lys Met His Phe Asp Glu Asn Ser Asp Met Ala Ser Asn Tyr Thr
                245                  250                  255
Ile Ile Asn Trp His Arg Ser Ala Glu Asp Gly Ser Val Val Phe Glu
            260                  265                  270
Asp Val Gly Tyr Tyr Ser Met His Val Lys Arg Gly Ala Lys Leu Phe
            275                  280                  285
Ile Asp Lys Thr Lys Ile Leu Trp Asn Gly Tyr Ser Ser Glu Ala Pro
        290                  295                  300
Phe Ser Asn Cys Ser Glu Asp Cys Glu Pro Gly Thr Arg Lys Gly Ile
305                  310                  315                  320
Ile Asp Ser Met Pro Thr Cys Cys Phe Glu Cys Thr Glu Cys Ser Asp
                325                  330                  335
Gly Glu Tyr Ser Asn His Lys Asp Ala Ser Val Cys Thr Lys Cys Pro
            340                  345                  350
Tyr Asn Ser Trp Ser Asn Gly Asn His Thr Phe Cys Phe Leu Lys Glu
            355                  360                  365
Ile Glu Phe Leu Ser Trp Thr Glu Pro Phe Gly Ile Ala Leu Ala Ile
        370                  375                  380
Cys Ala Val Leu Gly Val Leu Leu Thr Ala Phe Val Ile Gly Val Phe
385                  390                  395                  400
Val Arg Phe Arg Asn Thr Pro Ile Val Lys Ala Thr Asn Arg Glu Leu
                405                  410                  415
Ser Tyr Val Leu Leu Xaa Ser Leu Ile Cys Cys Phe Ser Ser Ser Leu
            420                  425                  430
Xaa Phe Ile
        435
```

```
<210> 13
<211> 23
<212> PRT
<213> Artificial Sequence

<220>
<223> primer

<400> 13
Asp Asp Asp Tyr Gly Arg Pro Gly Ile Glu Lys Phe Arg Glu Glu Ala
 1               5                   10                  15
Glu Glu Arg Asp Ile Cys Ile
                20


<210> 14
<211> 17
<212> PRT
```

<213> Artificial Sequence

<220>
<223> primer

<400> 14
Ala Arg Ser Arg Asn Ser Ala Asp Gly Arg Ser Gly Asp Asp Leu Pro
 1   5   10   15
Cys

<210> 15
<211> 20
<212> DNA
<213> a primer

<220>
<221> unsure
<222> (3)...(3)
<223> N = deoxyinosine

<221> unsure
<222> (9)...(9)
<223> Y = C+T

<221> unsure
<222> (12)...(12)
<223> Y = C+T

<221> unsure
<222> (15)...(15)
<223> Y = C+T

<221> unsure
<222> (18)...(18)
<223> Y = C+T

<400> 15
gcngctgayg aygaytaygg   20

<210> 16
<211> 24
<212> DNA
<213> a primer

<220>
<221> unsure
<222> (4)...(4)
<223> N=deoxyinosine

<221> unsure
<222> (7)...(7)
<223> Y=C+T

<221> unsure
<222> (10)...(10)
<223> N=deoxyinosine

<221> unsure
<222> (13)...(13)
<223> Y=C+T

<221> unsure
<222> (16)...(16)
<223> Y=C+T

<221> unsure
<222> (22)...(22)
<223> R=A+G

<400> 16
ccangcytcn agyttyttda trtc   24

<210> 17
<211> 28
<212> DNA
<213> a primer

<220>
<221> unsure
<222> (5)...(5)
<223> K=T+G

<221> unsure
<222> (20)...(20)
<223> Y=C+T

<221> unsure
<222> (23)...(23)
<223> R=A+G

<400> 17
tgtcktggac ggagcccttty ggratcgc   28

<210> 18
<211> 34
<212> DNA
<213> a primer

<220>
<221> unsure
<222> (7)...(7)
<223> K=T+G

<221> unsure
<222> (10)...(10)
<223> R=A+G

<221> unsure
<222> (16)...(16)
<223> R=A+G

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